CLAIMS:

1. A process for producing plastic/wood fiber composite foamed structures comprising the steps of:

pre-drying wood fiber filler having a degradation temperature and an active volatization temperature and maintaining the pre-drying temperature below the degradation temperature to produce dried wood fiber filler;

mixing the dried wood fiber filler with plastic to produce a plastic/wood fiber mixture and maintaining the mixing temperature below an active volatilizing temperature;

feeding the plastic/wood fiber mixture into an extruder;

introducing a blowing agent into the plastic/wood fiber mixture and mixing it therewith to produce a plastic/wood fiber/gas mixture;

subjecting the plastic/wood fiber/gas mixture to high shear forces in the presence of high pressures and maintaining the processing temperature below an active volatilizing temperature; and

extruding the plastic/wood fiber/gas mixture to produce a plastic/wood fiber composite foamed structure.

2. A process as claimed in claim 1 wherein the pre-drying temperature is between the active volatilization temperature and the degradation temperature.

3. A process as claimed in claim 1 wherein the pre-drying temperature is below 180°C.

4. A process as claimed in claim 3 wherein the mixing temperature is below 170°C.

5. A process as claimed in claim 4 wherein the processing temperature is below 170°C.

6. A process as claimed in claim 1 wherein the mixing temperature is below 170°C.

7. A process as claimed in claim 1 wherein the processing temperature is below 170°C.

8. A process as claimed in claim 1 wherein the blowing agent is volatiles devolved from the wood fiber during the mixing step and the subjecting step.

9. A process as claimed in claim 1 wherein the blowing agent is a physical blowing agent.

10. A process as claimed in claim 9 wherein the physical blowing agent is chosen from the group consisting of any of the non-reactive gases such as CO_2, N_2, He,

Ar, Air, or a mixture of thereof.

11. A process as claimed in claim 1 wherein the blowing agent is a chemical blowing agent.

12. A process as claimed in claim 5 wherein the blowing agent is volatiles devolved from the wood fiber during the mixing step and the subjecting step.

13. A process as claimed in claim 5 wherein the blowing agent is a physical blowing agent.

14. A process as claimed in claim 13 wherein the physical blowing agent is chosen from the group consisting of any of the non-reactive gases such as CO_2, N_2, He, Ar, Air, or a mixture of thereof.

15. A process as claimed in claim 5 wherein the blowing agent is a chemical blowing agent.

16. A process as claimed in claim 1 further including the step of reducing the temperature of the plastic/wood fiber/gas mixture prior to the step of extruding thereby stabilizing the cell structure in the plastic/wood fiber/gas mixture.

17. A process as claimed in claim 16 wherein the temperature is reduced in one of a cooling extruder and a heat exchanger.

18. A process as claimed in claim 5 further including the step of reducing the temperature of the plastic/wood fiber/gas mixture prior to the step of extruding thereby stabilizing the cell structure in the plastic/wood fiber/gas mixture.

19. A process as claimed in claim 18 wherein the temperature is reduced in one of a cooling extruder and a heat exchanger.

20. A process as claimed in claim 8 further including the step of reducing the temperature of the plastic/wood fiber/gas mixture prior to the step of extruding thereby stabilizing the cell structure in the plastic/wood fiber/gas mixture.

21. A process as claimed in claim 20 wherein the temperature is reduced in one of a cooling extruder and a heat exchanger.

22. A process as claimed in claim 9 further including the step of reducing the temperature of the plastic/wood fiber/gas mixture prior to the step of extruding thereby stabilizing the cell structure in the plastic/wood fiber/gas mixture.

23. A process as claimed in claim 22 wherein the temperature is reduced in one of a

cooling extruder and a heat exchanger.

24. A process as claimed in claim 11 further including the step of reducing the temperature of the plastic/wood fiber/gas mixture prior to the step of extruding thereby stabilizing the cell structure in the plastic/wood fiber/gas mixture.

25. A process as claimed in claim 24 wherein the temperature is reduced in one of a cooling extruder and a heat exchanger.

26. A process as claimed in claim 1 wherein the extruder includes cascade devolatization having a first cascade extruder and a second cascade extruder.

27. A process as claimed in claim 26 wherein the first cascade extruder is one of a twin screw extruder and a single screw extruder and the second cascade extruder is one of a twin screw extruder and a single screw extruder.

28. A process as claimed in claim 5 wherein the extruder includes cascade devolatization having a first cascade extruder and a second cascade extruder.

29. A process as claimed in claim 28 wherein the first cascade extruder is one of a twin screw extruder and a single screw extruder and the second cascade extruder is one of a twin screw extruder and a single screw extruder.

30. A process as claimed in claim 8 wherein the extruder includes cascade devolatization having a first cascade extruder and a second cascade extruder.

31. A process as claimed in claim 30 wherein the first cascade extruder is one of a twin screw extruder and a single screw extruder and the second cascade extruder is one of a twin screw extruder and a single screw extruder.

32. A process as claimed in claim 9 wherein the extruder includes cascade devolatization having a first cascade extruder and a second cascade extruder.

33. A process as claimed in claim 32 wherein the first cascade extruder is one of a twin screw extruder and a single screw extruder and the second cascade extruder is one of a twin screw extruder and a single screw extruder.

34. A process as claimed in claim 11 wherein the extruder includes cascade devolatization having a first cascade extruder and a second cascade extruder.

35. A process as claimed in claim 34 wherein the first cascade extruder is one of a twin screw extruder and a single screw extruder and the second cascade extruder is one of a twin screw extruder and a single screw extruder.

36. A process as claimed in claim 16 wherein the extruder includes cascade devolatization having a first cascade extruder and a second cascade extruder.

37. A process as claimed in claim 37 wherein the first cascade extruder is one of a twin screw extruder and a single screw extruder and the second cascade extruder is one of a twin screw extruder and a single screw extruder.

38. A process as claimed in claim 18 wherein the extruder includes cascade devolatization having a first cascade extruder and a second cascade extruder.

39. A process as claimed in claim 38 wherein the first cascade extruder is one of a twin screw extruder and a single screw extruder and the second cascade extruder is one of a twin screw extruder and a single screw extruder.

40. A process as claimed in claim 20 wherein the extruder includes cascade devolatization having a first cascade extruder and a second cascade extruder.

41. A process as claimed in claim 40 wherein the first cascade extruder is one of a twin screw extruder and a single screw extruder and the second cascade extruder is one of a twin screw extruder and a single screw extruder.

42. A process as claimed in claim 22 wherein the extruder includes cascade

devolatization having a first cascade extruder and a second cascade extruder.

43. A process as claimed in claim 42 wherein the first cascade extruder is one of a twin screw extruder and a single screw extruder and the second cascade extruder is one of a twin screw extruder and a single screw extruder.

44. A process as claimed in claim 24 wherein the extruder includes cascade devolatization having a first cascade extruder and a second cascade extruder.

45. A process as claimed in claim 44 wherein the first cascade extruder is one of a twin screw extruder and a single screw extruder and the second cascade extruder is one of a twin screw extruder and a single screw extruder.

46. A process as claimed in claim 1 wherein the extruder is one of a twin screw extruder and a single screw extruder.

47. A process as claimed in claim 5 wherein the extruder is one of a twin screw extruder and a single screw extruder.

48. A process as claimed in claim 8 wherein the extruder is one of a twin screw extruder and a single screw extruder.

49. A process as claimed in claim 9 wherein the extruder is one of a twin screw extruder and a single screw extruder.

50. A process as claimed in claim 11 wherein the extruder is one of a twin screw extruder and a single screw extruder.

51. A process as claimed in claim 16 wherein the extruder is one of a twin screw extruder and a single screw extruder.

52. A process as claimed in claim 18 wherein the extruder is one of a twin screw extruder and a single screw extruder.

53. A process as claimed in claim 20 wherein the extruder is one of a twin screw extruder and a single screw extruder.

54. A process as claimed in claim 22 wherein the extruder is one of a twin screw extruder and a single screw extruder.

55. A process as claimed in claim 24 wherein the extruder is one of a twin screw extruder and a single screw extruder.

56. A process as claimed in claim 26 wherein the extruder is one of a twin screw

extruder and a single screw extruder.

57. A process as claimed in claim 28 wherein the extruder is one of a twin screw extruder and a single screw extruder.

58. A process as claimed in claim 30 wherein the extruder is one of a twin screw extruder and a single screw extruder.

59. A process as claimed in claim 32 wherein the extruder is one of a twin screw extruder and a single screw extruder.

60. A process as claimed in claim 34 wherein the extruder is one of a twin screw extruder and a single screw extruder.

61. A process as claimed in claim 36 wherein the extruder is one of a twin screw extruder and a single screw extruder.

62. A process as claimed in claim 38 wherein the extruder is one of a twin screw extruder and a single screw extruder.

63. A process as claimed in claim 40 wherein the extruder is one of a twin screw extruder and a single screw extruder.

64. A process as claimed in claim 42 wherein the extruder is one of a twin screw extruder and a single screw extruder.

65. A process as claimed in claim 44 wherein the extruder is one of a twin screw extruder and a single screw extruder.

66. A process for producing plastic/wood fiber composite foamed structures comprising the steps of:

pre-drying wood fiber filler to produce dried wood fiber filler;

mixing the dried wood fiber filler with plastic to produce a plastic/wood fiber mixture;

feeding the plastic/wood fiber mixture into an extruder;

mixing a physical blowing agent into the plastic/wood fiber mixture to produce a plastic/wood fiber/gas mixture;

subjecting the plastic/wood fiber/gas mixture to high shear forces in the presence of high pressures; and

extruding the plastic/wood fiber/gas mixture to produce a plastic/wood fiber composite foamed structure.

67. A process as claimed in claim 66 further including the step of reducing the temperature of the plastic/wood fiber/gas mixture prior to the step of extruding

thereby stabilizing the cell structure in the plastic/wood fiber/gas mixture.

68. A process as claimed in claim 67 wherein the physical blowing agent is chosen from the group consisting of CO_2 and N_2.